

# SEQUENCE LISTING

<110> Blumenberg, Miroslav  
Gazel, Alix M

<120> GENES AND POLYNUCLEOTIDES ASSOCIATED WITH ULTRAVIOLET  
RADIATION-MEDIATED SKIN DAMAGE AND USES THEREOF

<130> PC10489A

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<150> 60/155,029

<151> 1999-09-20

<160> 19

<170> PatentIn Ver. 2.1

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<221> CDS

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1 5 10 15

cat gat gac atc tgc aat aaa act ttg aag att aca gat ttt ggg ttg 97  
His Asp Asp Ile Cys Asn Lys Thr Leu Lys Ile Thr Asp Phe Gly Leu  
20 25 30

gcg agg gaa tgg cac agg acc acc aaa atg agc aca gca ggc acc tat 145  
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                   20                  25                  30  
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 gtg aag ctg tca gac ttt ggg ttc tgc gcc cag gtg agc aag gaa gtg 97  
 Val Lys Leu Ser Asp Phe Gly Phe Cys Ala Gln Val Ser Lys Glu Val  
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 ccc cga agg aag tcg ctg gtc ggc acg ccc tac tgg atg gcc cca gag 145  
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gtg aag ctc tcg gac ttc gga ttc tgt gct cag atc agc aaa gac gtc 97  
 Val Lys Leu Ser Asp Phe Gly Phe Cys Ala Gln Ile Ser Lys Asp Val  
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 Thr Phe Ser Pro Leu Thr Thr Ser Asp

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acc agc agc ccc cag aag tcc ctc cgc aca gcc ccg gcc aca ggc cag 942  
 Thr Ser Ser Pro Gln Lys Ser Leu Arg Thr Ala Pro Ala Thr Gly Gln  
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ctt cca ggc cgg tct tcc cca gcg gga tcc ccc cgc acc tgg cac gcc 990  
 Leu Pro Gly Arg Ser Ser Pro Ala Gly Ser Pro Arg Thr Trp His Ala  
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cag atc agc acc agc aac ctg tac ctg ccc cag gac ccc acg gtt gcc 1038  
 Gln Ile Ser Thr Ser Asn Leu Tyr Leu Pro Gln Asp Pro Thr Val Ala  
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aag ggt gcc ctg gct ggt gag gac aca ggt gtt gtg aca cat gag cag 1086  
 Lys Gly Ala Leu Ala Gly Glu Asp Thr Gly Val Val Thr His Glu Gln  
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ttc aag gct gcg ctc agg atg gtg gtg gac cag ggt gac ccc ccg ctg 1134  
 Phe Lys Ala Ala Leu Arg Met Val Val Asp Gln Gly Asp Pro Arg Leu  
 75 80 85

ctg ctg gac agc tac gtg aag att ggc gag ggc tcc acc ggc atc gtc 1182  
 Leu Leu Asp Ser Tyr Val Lys Ile Gly Glu Gly Ser Thr Gly Ile Val  
 90 95 100 105

tgc ttg gcc cgg gaa gaa cac tcg ggc cgc cag gtg gcc gtc aag atg 1230  
 Cys Leu Ala Arg Glu Glu His Ser Gly Arg Gln Val Ala Val Lys Met  
 110 115 120

atg gac ctc aga aag cag cag cgc agg gag ctg ctc ttc aac gag 1275  
 Met Asp Leu Arg Lys Gln Gln Arg Arg Glu Leu Leu Phe Asn Glu  
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actcaggccc ccacctgccc ccag gtg gtg atc atg cgg gac tac cag cac 1446  
Val Val Ile Met Arg Asp Tyr Gln His  
140 145

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Phe Asn Val Val Glu Met Tyr Lys Ser Tyr Leu Val Gly Glu Glu Leu  
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Trp Val Leu Met Glu Phe Leu Gln Gly Gly Ala Leu Thr Asp Ile Val  
165 170 175

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Ser Gln Val Arg  
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gtccag g ctg aat gag gag cag att gcc act gtg tgt gag gct gtg ctg 1942  
Leu Asn Glu Glu Gln Ile Ala Thr Val Cys Glu Ala Val Leu  
185 190 195

cag gcc ctg gcc tac ctg cat gct cag ggt gtc atc cac cgg gac atc 1990  
Gln Ala Leu Ala Tyr Leu His Ala Gln Gly Val Ile His Arg Asp Ile  
200 205 210

aag agt gac tcc atc ctg ctg acc ctc gat ggc agg gtaggtccca 2036  
Lys Ser Asp Ser Ile Leu Leu Thr Leu Asp Gly Arg  
215 220

tcctgtccct ggcacagcca cgctcccact tcctcctgat ccaccactca ctcccttttc 2096

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Val Lys Leu Ser Asp Phe Gly Phe Cys Ala Gln Ile Ser Lys  
225 230 235

gac gtc cct aag agg aag tcc ctg gtg gga acc ccc tac tgg atg gct 2194  
Asp Val Pro Lys Arg Lys Ser Leu Val Gly Thr Pro Tyr Trp Met Ala  
240 245 250

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Pro Glu Val Ile Ser Arg Ser Leu Tyr Ala Thr Glu  
255 260 265

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Val Asp Ile Trp Ser Leu  
270

ggg atc atg gtg att gag atg gta gat ggg gag cca ccg tac ttc agt 2761  
Gly Ile Met Val Ile Glu Met Val Asp Gly Glu Pro Pro Tyr Phe Ser  
275 280 285

gac tcc cca gtg caa gcc atg aag agg ctc cgg gac agc ccc cca ccc 2809  
Asp Ser Pro Val Gln Ala Met Lys Arg Leu Arg Asp Ser Pro Pro Pro  
290 295 300

aag ctg aaa aac tct cac aag gtc agttggcaca caagggtgcg acctcgcaga 2863  
Lys Leu Lys Asn Ser His Lys Val  
305 310

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 35 40 45

Tyr Leu Pro Gln Asp Pro Thr Val Ala Lys Gly Ala Leu Ala Gly Glu  
 50 55 60

Asp Thr Gly Val Val Thr His Glu Gln Phe Lys Ala Ala Leu Arg Met  
 65 70 75 80

Val Val Asp Gln Gly Asp Pro Arg Leu Leu Leu Asp Ser Tyr Val Lys  
 85 90 95

Ile Gly Glu Gly Ser Thr Gly Ile Val Cys Leu Ala Arg Glu Glu His  
 100 105 110

Ser Gly Arg Gln Val Ala Val Lys Met Met Asp Leu Arg Lys Gln Gln  
 115 120 125

Arg Arg Glu Leu Leu Phe Asn Glu Val Val Ile Met Arg Asp Tyr Gln  
 130 135 140

His Phe Asn Val Val Glu Met Tyr Lys Ser Tyr Leu Val Gly Glu Glu



145		150		155		160
Leu Trp Val	Leu Met Glu Phe Leu Gln Gly Gly Ala Leu Thr Asp Ile					
	165		170		175	
Val Ser Gln Val Arg Leu Asn Glu Glu Gln Ile Ala Thr Val Cys Glu						
	180		185		190	
Ala Val Leu Gln Ala Leu Ala Tyr Leu His Ala Gln Gly Val Ile His						
	195		200		205	
Arg Asp Ile Lys Ser Asp Ser Ile Leu Leu Thr Leu Asp Gly Arg Val						
	210		215		220	
Lys Leu Ser Asp Phe Gly Phe Cys Ala Gln Ile Ser Lys Asp Val Pro						
	225		230		235	240
Lys Arg Lys Ser Leu Val Gly Thr Pro Tyr Trp Met Ala Pro Glu Val						
	245		250		255	
Ile Ser Arg Ser Leu Tyr Ala Thr Glu Val Asp Ile Trp Ser Leu Gly						
	260		265		270	
Ile Met Val Ile Glu Met Val Asp Gly Glu Pro Pro Tyr Phe Ser Asp						
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Ser Pro Val Gln Ala Met Lys Arg Leu Arg Asp Ser Pro Pro Pro Lys						
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cctctcctca gcgcctaaga gagaggccca gtgcgggtga ggagtcgcga ggaagaggcg 180

gaaggcgccg gaaggacc atg ttc cgc aag aaa aag aag aaa cgc cct gag 231  
Met Phe Arg Lys Lys Lys Lys Lys Arg Pro Glu  
1 5 10

atc tca gcg cca cag aac ttc cag cac cgt gtc cac acc tcc ttc gac 279  
Ile Ser Ala Pro Gln Asn Phe Gln His Arg Val His Thr Ser Phe Asp  
15 20 25

ccc aaa gaa ggc aag ttt gtg ggc ctc ccc cca caa tgg cag aac atc 327  
Pro Lys Glu Gly Lys Phe Val Gly Leu Pro Pro Gln Trp Gln Asn Ile  
30 35 40

ctg gac aca ctg cgg cgc ccc aag ccc gtg gtg gac cct tcg cga atc 375  
Leu Asp Thr Leu Arg Arg Pro Lys Pro Val Val Asp Pro Ser Arg Ile  
45 50 55

aca cgg gtg cag ctc cag ccc atg aag aca gtg gtg cgg ggc agc gcg 423  
Thr Arg Val Gln Leu Gln Pro Met Lys Thr Val Val Arg Gly Ser Ala  
60 65 70 75

atg cct gtg gat ggc tac atc tcg ggg ctg ctc aac gac atc cag aag 471  
Met Pro Val Asp Gly Tyr Ile Ser Gly Leu Leu Asn Asp Ile Gln Lys  
80 85 90

ttg tca gtc atc agc tcc aac acc ctg cgt ggt cgc agc ccc acc agc 519  
Leu Ser Val Ile Ser Ser Asn Thr Leu Arg Gly Arg Ser Pro Thr Ser  
95 100 105

cgg cgg cgg gca cag tcc ctg ggg ctg ctg ggg gat gag cac tgg gcc 567  
Arg Arg Arg Ala Gln Ser Leu Gly Leu Leu Gly Asp Glu His Trp Ala  
110 115 120

acc gac cca gac atg tac ctc cag agc ccc cag tct gag cgc act gac 615  
Thr Asp Pro Asp Met Tyr Leu Gln Ser Pro Gln Ser Glu Arg Thr Asp  
125 130 135

ccc cac ggc ctc tac ctc agc tgc aac ggg ggc aca cca gca ggc cac 663  
Pro His Gly Leu Tyr Leu Ser Cys Asn Gly Gly Thr Pro Ala Gly His  
140 145 150 155

aag cag atg ccg tgg ccc gag cca cag agc cca cgg gtc ctg ccc aat 711  
Lys Gln Met Pro Trp Pro Glu Pro Gln Ser Pro Arg Val Leu Pro Asn  
160 165 170

ggg ctg gct gca aag gca cag tcc ctg ggc ccc gcc gag ttt cag ggt 759  
Gly Leu Ala Ala Lys Ala Gln Ser Leu Gly Pro Ala Glu Phe Gln Gly

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Ala Ser Gln Arg Cys Leu Gln Leu Gly Ala Cys Leu Gln Ser Ser Pro			
190	195	200	
cca gga gcc tcg ccc ccc acg ggc acc aat agg cat gga atg aag gct			855
Pro Gly Ala Ser Pro Pro Thr Gly Thr Asn Arg His Gly Met Lys Ala			
205	210	215	
gcc aag cat ggc tct gag gag gcc cgg cca cag tcc tgc ctg gtg ggc			903
Ala Lys His Gly Ser Glu Glu Ala Arg Pro Gln Ser Cys Leu Val Gly			
220	225	230	235
tca gcc aca ggc agg cca ggt ggg gaa ggc agc cct agc cct aag acc			951
Ser Ala Thr Gly Arg Pro Gly Gly Glu Gly Ser Pro Ser Pro Lys Thr			
240	245	250	
cgg gag agc agc ctg aag cgc agg cta ttc cga agc atg ttc ctg tcc			999
Arg Glu Ser Ser Leu Lys Arg Arg Leu Phe Arg Ser Met Phe Leu Ser			
255	260	265	
act gct gcc aca gcc cct cca agc agc agc aag cca ggc cct cca cca			1047
Thr Ala Ala Thr Ala Pro Pro Ser Ser Ser Lys Pro Gly Pro Pro Pro			
270	275	280	
cag agc aag ccc aac tcc tct ttc cga ccg ccg cag aaa gac aac ccc			1095
Gln Ser Lys Pro Asn Ser Ser Phe Arg Pro Pro Gln Lys Asp Asn Pro			
285	290	295	
cca agc ctg gtg gcc aag gcc cag tcc ttg ccc tcg gac cag ccg gtg			1143
Pro Ser Leu Val Ala Lys Ala Gln Ser Leu Pro Ser Asp Gln Pro Val			
300	305	310	315
ggg acc ttc agc cct ctg acc act tcg gat acc agc agc ccc cag aag			1191
Gly Thr Phe Ser Pro Leu Thr Thr Ser Asp Thr Ser Ser Pro Gln Lys			
320	325	330	
tcc ctg cgc aca gcc ccg gcc aca ggc cag ctt cca ggc cgg tct tcc			1239
Ser Leu Arg Thr Ala Pro Ala Thr Gly Gln Leu Pro Gly Arg Ser Ser			
335	340	345	
cca gcg gga tcc ccc cgc acc tgg cac gcc cag atc agc acc agc aac			1287
Pro Ala Gly Ser Pro Arg Thr Trp His Ala Gln Ile Ser Thr Ser Asn			
350	355	360	
ctg tac ctg ccc cag gac ccc acg gtt gcc aag ggt gcc ctg gct ggt			1335
Leu Tyr Leu Pro Gln Asp Pro Thr Val Ala Lys Gly Ala Leu Ala Gly			

365	370	375	
gag gac aca ggt gtt gtg aca cat gag cag ttc aag gct gcg ctc agg			1383
Glu Asp Thr Gly Val Val Thr His Glu Gln Phe Lys Ala Ala Leu Arg			
380	385	390	395
atg gtg gtg gac cag ggt gac ccc cgg ctg ctg ctg gac agc tac gtg			1431
Met Val Val Asp Gln Gly Asp Pro Arg Leu Leu Leu Asp Ser Tyr Val			
	400	405	410
aag att ggc gag ggc tcc acc ggc atc gtc tgc ttg gcc cgg gag aag			1479
Lys Ile Gly Glu Gly Ser Thr Gly Ile Val Cys Leu Ala Arg Glu Lys			
	415	420	425
cac tcg ggc cgc cag gtg gcc gtc aag atg atg gac ctc agg aag cag			1527
His Ser Gly Arg Gln Val Ala Val Lys Met Met Asp Leu Arg Lys Gln			
	430	435	440
cag cgc agg gag ctg ctc ttc aac gag gtg gtg atc atg cgg gac tac			1575
Gln Arg Arg Glu Leu Leu Phe Asn Glu Val Val Ile Met Arg Asp Tyr			
	445	450	455
cag cac ttc aac gtg gtg gag atg tac aag agc tac ctg gtg gga gag			1623
Gln His Phe Asn Val Val Glu Met Tyr Lys Ser Tyr Leu Val Gly Glu			
460	465	470	475
gag ctg tgg gtg ctc atg gag ttc ctg cag gga gga gcc ctc aca gac			1671
Glu Leu Trp Val Leu Met Glu Phe Leu Gln Gly Gly Ala Leu Thr Asp			
	480	485	490
atc gtc tcc caa gtc agg ctg aat gag gag cag att gcc act gtg tgt			1719
Ile Val Ser Gln Val Arg Leu Asn Glu Glu Gln Ile Ala Thr Val Cys			
	495	500	505
gag gct gtg ctg cag gcc ctg gcc tac ctg cat gct cag ggt gtc atc			1767
Glu Ala Val Leu Gln Ala Leu Ala Tyr Leu His Ala Gln Gly Val Ile			
	510	515	520
cac cgg gac atc aag agt gac tcc atc ctg ctg acc ctc gat ggc agg			1815
His Arg Asp Ile Lys Ser Asp Ser Ile Leu Leu Thr Leu Asp Gly Arg			
	525	530	535
gtg aag ctc tcg gac ttc gga ttc tgt gct cag atc agc aaa gac gtc			1863
Val Lys Leu Ser Asp Phe Gly Phe Cys Ala Gln Ile Ser Lys Asp Val			
540	545	550	555
cct aag agg aag tcc ctg gtg gga acc ccc tac tgg atg gct cct gaa			1911
Pro Lys Arg Lys Ser Leu Val Gly Thr Pro Tyr Trp Met Ala Pro Glu			

560	565	570	
gtg atc tcc agg tct ttg tat gcc act gag gtg gat atc tgg tct ctg			1959
Val Ile Ser Arg Ser Leu Tyr Ala Thr Glu Val Asp Ile Trp Ser Leu			
575	580	585	
ggc atc atg gtg att gag atg gta gat ggg gag cca ccg tac ttc agt			2007
Gly Ile Met Val Ile Glu Met Val Asp Gly Glu Pro Pro Tyr Phe Ser			
590	595	600	
gac tcc cca gtg caa gcc atg aag agg ctc cgg gac agc ccc cca ccc			2055
Asp Ser Pro Val Gln Ala Met Lys Arg Leu Arg Asp Ser Pro Pro Pro			
605	610	615	
aag ctg aaa aac tct cac aag gtc tcc cca gtg ctg cga gac ttc ctg			2103
Lys Leu Lys Asn Ser His Lys Val Ser Pro Val Leu Arg Asp Phe Leu			
620	625	630	635
gag cgg atg ctg gtg cgg gac ccc caa gag aga gcc aca gcc cag gag			2151
Glu Arg Met Leu Val Arg Asp Pro Gln Glu Arg Ala Thr Ala Gln Glu			
640	645	650	
ctc cta gac cac ccc ttc ctg ctg cag aca ggg cta cct gag tgc ctg			2199
Leu Leu Asp His Pro Phe Leu Leu Gln Thr Gly Leu Pro Glu Cys Leu			
655	660	665	
gtg ccc ctg atc cag ctc tac cga aag cag acc tcc acc tgc tga			2244
Val Pro Leu Ile Gln Leu Tyr Arg Lys Gln Thr Ser Thr Cys			
670	675	680	
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